

**UHF amplifier modules****BGY115A; BGY115B;  
BGY115C/P; BGY115D****FEATURES**

- 6 V nominal supply voltage
- 1996 May 13
- 1.2 W output power (BGY115A, BGY115B and BGY115D)
- 1.4 W output power (BGY115C/P)
- Easy control of output power by DC voltage
- SMD outline.

**PINNING - SOT321A**

PIN	DESCRIPTION
1	RF input
2	$V_C$
3	$V_S$
4	RF output
Flange	ground

**APPLICATIONS**

- Hand-held transmitting equipment operating in the 824 to 849 MHz, 872 to 905 MHz, 890 to 915 MHz and 902 to 928 MHz frequency ranges.

**DESCRIPTION**

The BGY115A, BGY115B, BGY115C/P and BGY115D are three-stage UHF amplifier modules. Each module consists of three NPN silicon planar transistor chips mounted together with matching and bias circuit components on a metallized ceramic substrate.

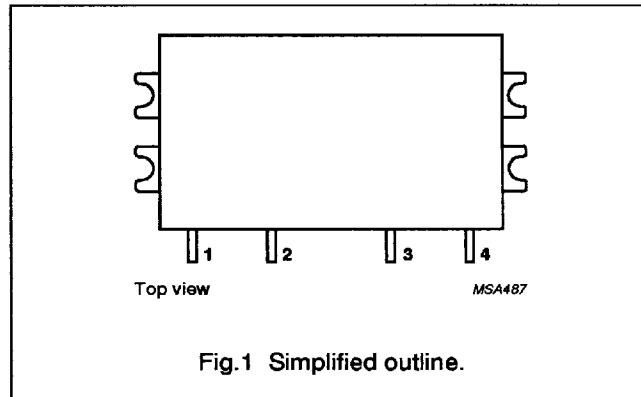


Fig.1 Simplified outline.

**QUICK REFERENCE DATA**RF performance at  $T_{mb} = 25^\circ\text{C}$ .

TYPE NUMBER	MODE OF OPERATION	f (MHz)	$V_S$ (V)	$P_L$ (W)	$G_p$ (dB)	$\eta$ (%)	$Z_S; Z_L$ ( $\Omega$ )
BGY115A	CW	824 to 849	6	1.2	≥27.8	typ. 50	50
BGY115B	CW	872 to 905	6	1.2	≥27.8	typ. 50	50
BGY115C/P	CW	890 to 915	6	1.4	≥28.5	typ. 50	50
BGY115D	CW	902 to 928	6	1.2	≥27.8	typ. 50	50

**LIMITING VALUES**

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	MIN.	MAX.	UNIT
$V_S$	DC supply voltage BGY115A, BGY115B, BGY115D BGY115C/P	-	8.5 9	V V
$V_C$	DC control voltage	-	4	V
$P_D$	input drive power	-	5	mW
$P_L$	load power BGY115A, BGY115B, BGY115D BGY115C/P	-	1.6 1.8	W W
$T_{stg}$	storage temperature	-40	+100	°C
$T_{mb}$	operating mounting base temperature	-30	+100	°C

## UHF amplifier modules

BGY115A; BGY115B;  
BGY115C/P; BGY115D

## CHARACTERISTICS

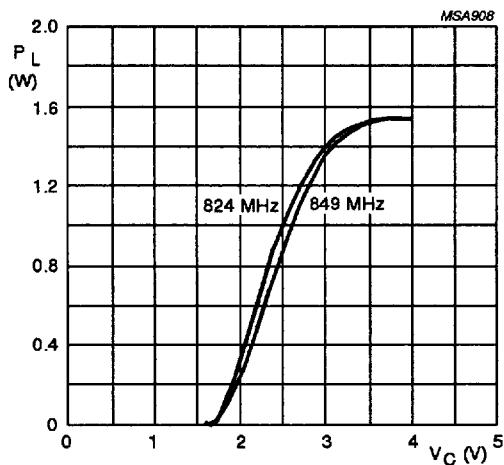
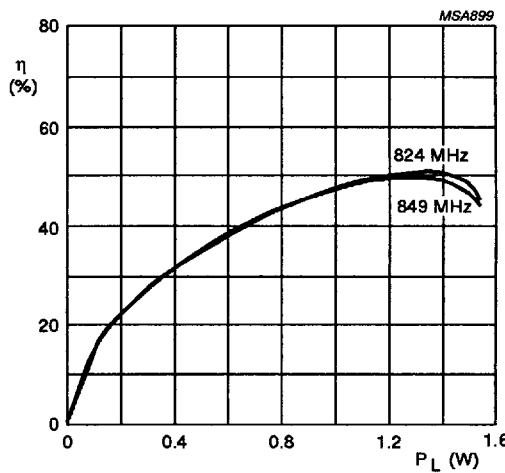
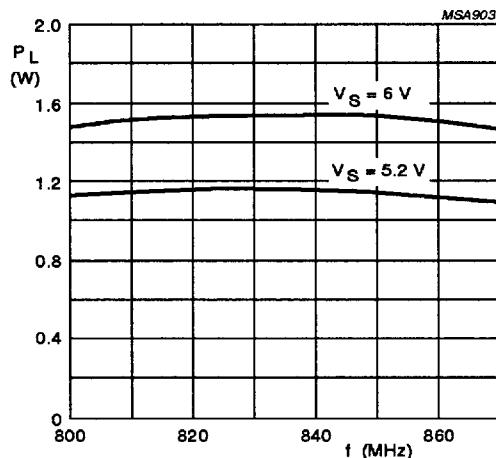
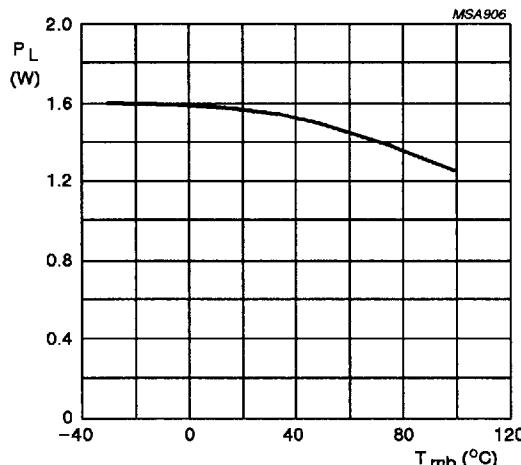
 $Z_S = Z_L = 50 \Omega$ ;  $P_D = 2 \text{ mW}$ ;  $V_S = 6 \text{ V}$ ;  $V_C \leq 3.5 \text{ V}$ ;  $T_{mb} = 25^\circ\text{C}$ ; unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
f	frequency BGY115A BGY115B BGY115C/P BGY115D		824	-	849	MHz
			872	-	905	MHz
			890	-	915	MHz
			902	-	928	MHz
$I_Q$	leakage current	$V_C = 0$ ; $P_D < -60 \text{ dBm}$	-	-	100	$\mu\text{A}$
$I_C$	control current	note 1	-	-	500	$\mu\text{A}$
$P_L$	load power BGY115A, BGY115B, BGY115D BGY115C/P		1.2	-	-	W
			1.4	-	-	W
$G_p$	power gain BGY115A, BGY115B, BGY115D BGY115C/P	note 1	27.8	-	-	dB
			28.5	-	-	dB
$\eta$	efficiency	note 1	45	50	-	%
$H_2$	second harmonic	note 1	-	-	-40	$\text{dBc}$
$H_3$	third harmonic	note 1	-	-	-40	$\text{dBc}$
$VSWR_{in}$	input VSWR	note 1	-	-	3 : 1	
	stability	$P_D = 0$ to $6 \text{ dBm}$ ; $V_S = 4.8$ to $8.5 \text{ V}$ ; $V_C = 0$ to $3.5 \text{ V}$ ; $VSWR \leq 6 : 1$ through all phases; note 2	-	-	-60	$\text{dBc}$
	isolation	$V_C = 0$	-	-	-40	$\text{dBm}$
$P_n$	noise power	bandwidth = 30 kHz; 45 MHz above $f_0$ ; note 1	-	-	-90	$\text{dBm}$
	ruggedness	note 3	no degradation			

## Notes

1. Adjust  $V_C$  for  $P_L = 1.2 \text{ W}$  (BGY115A, BGY115B and BGY115D);  $P_L = 1.4 \text{ W}$  (BGY115C/P).
2. Adjust  $V_C$  for  $P_L \leq 1.2 \text{ W}$  (BGY115A, BGY115B and BGY115D);  $P_L \leq 1.4 \text{ W}$ ,  $V_S = 4.8$  to  $8 \text{ V}$  (BGY115C/P).
3. Adjust  $V_C$  for  $P_L = 1.6 \text{ W}$ ;  $V_S = 8.5 \text{ V}$ ;  $VSWR \leq 10 : 1$ ; (BGY115A, BGY115B and BGY115D). Adjust  $V_C$  for  $P_L = 1.6 \text{ W}$ ;  $V_S = 9 \text{ V}$ ,  $VSWR \leq 6 : 1$  (BGY115C/P).

## UHF amplifier modules

BGY115A; BGY115B;  
BGY115C/P; BGY115D $Z_S = Z_L = 50 \Omega$ ;  $P_D = 2 \text{ mW}$ ;  $V_S = 6 \text{ V}$ ;  $T_{mb} = 25^\circ\text{C}$ .Fig.2 Load power as a function of control voltage;  
BGY115A, typical values. $Z_S = Z_L = 50 \Omega$ ;  $P_D = 2 \text{ mW}$ ;  $V_S = 6 \text{ V}$ ;  $T_{mb} = 25^\circ\text{C}$ .Fig.3 Efficiency as a function of load power;  
BGY115A, typical values. $Z_S = Z_L = 50 \Omega$ ;  $P_D = 2 \text{ mW}$ ;  $V_C = 3.5 \text{ V}$ ;  $T_{mb} = 25^\circ\text{C}$ .Fig.4 Load power as a function of frequency;  
BGY115A, typical values. $Z_S = Z_L = 50 \Omega$ ;  $P_D = 2 \text{ mW}$ ;  $V_S = 6 \text{ V}$ ;  $V_C = 3.5 \text{ V}$ ;  $T_{mb} = 25^\circ\text{C}$ .Fig.5 Load power as a function of mounting base  
temperature; BGY115A, typical values.

## UHF amplifier modules

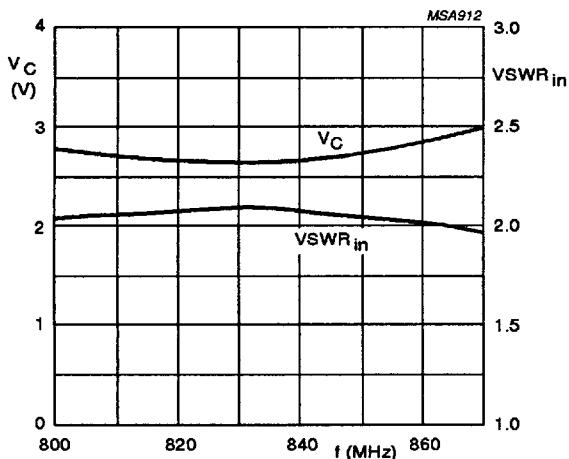
BGY115A; BGY115B;  
BGY115C/P; BGY115D $Z_S = Z_L = 50 \Omega$ ;  $P_D = 2 \text{ mW}$ ;  $P_L = 1.2 \text{ W}$ ;  $V_S = 6 \text{ V}$ ;  $T_{mb} = 25^\circ\text{C}$ .

Fig.6 Control voltage and VSWR input as functions of frequency; BGY115A, typical values.

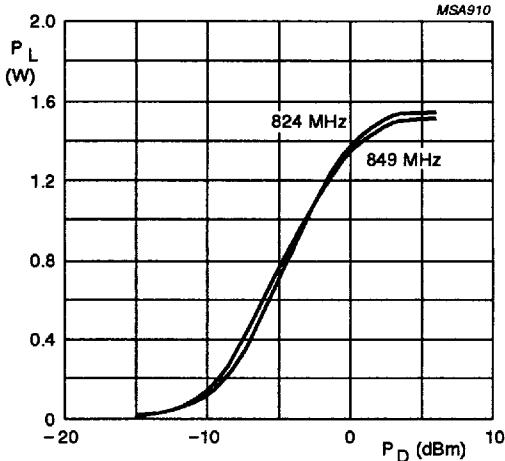
 $Z_S = Z_L = 50 \Omega$ ;  $V_S = 6 \text{ V}$ ;  $V_C = 3.5 \text{ V}$ ;  $T_{mb} = 25^\circ\text{C}$ .

Fig.7 Load power as a function of drive power; BGY115A, typical values.

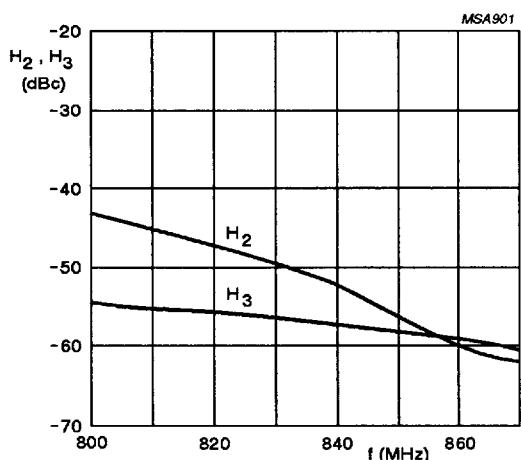
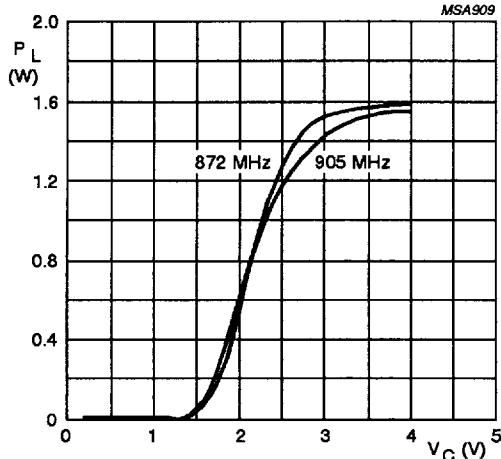
 $Z_S = Z_L = 50 \Omega$ ;  $P_D = 2 \text{ mW}$ ;  $P_L = 1.2 \text{ W}$ ;  $V_S = 6 \text{ V}$ ;  $T_{mb} = 25^\circ\text{C}$ .

Fig.8 Harmonics as functions of frequency; BGY115A, typical values.

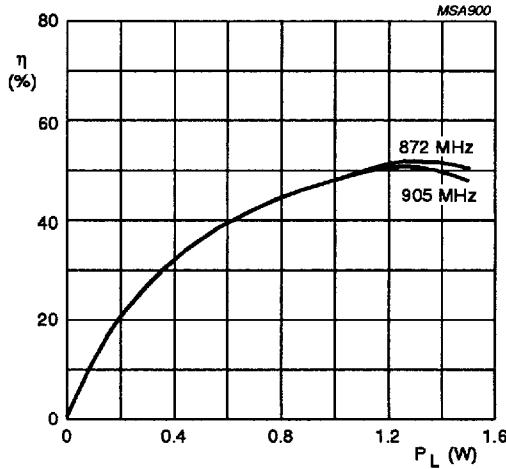
## UHF amplifier modules

BGY115A; BGY115B;  
BGY115C/P; BGY115D



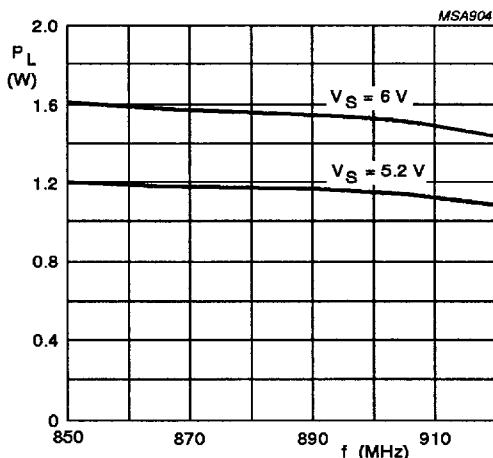
$Z_S = Z_L = 50 \Omega$ ;  $P_D = 2 \text{ mW}$ ;  $V_S = 6 \text{ V}$ ;  $T_{mb} = 25^\circ\text{C}$ .

Fig.9 Load power as a function of control voltage;  
BGY115B, typical values.



$Z_S = Z_L = 50 \Omega$ ;  $P_D = 2 \text{ mW}$ ;  $V_S = 6 \text{ V}$ ;  $T_{mb} = 25^\circ\text{C}$ .

Fig.10 Efficiency as a function of load power;  
BGY115B, typical values.



$Z_S = Z_L = 50 \Omega$ ;  $P_D = 2 \text{ mW}$ ;  $V_C = 3.5 \text{ V}$ ;  $T_{mb} = 25^\circ\text{C}$ .

Fig.11 Load power as a function of frequency;  
BGY115B, typical values.

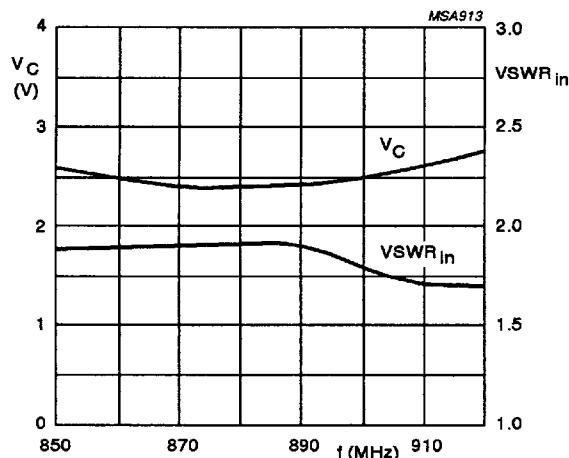


$Z_S = Z_L = 50 \Omega$ ;  $P_D = 2 \text{ mW}$ ;  $V_S = 6 \text{ V}$ ;  $V_C = 3.5 \text{ V}$ ;  $f = 890 \text{ MHz}$ .

Fig.12 Load power as a function of mounting base  
temperature; BGY115B, typical values.

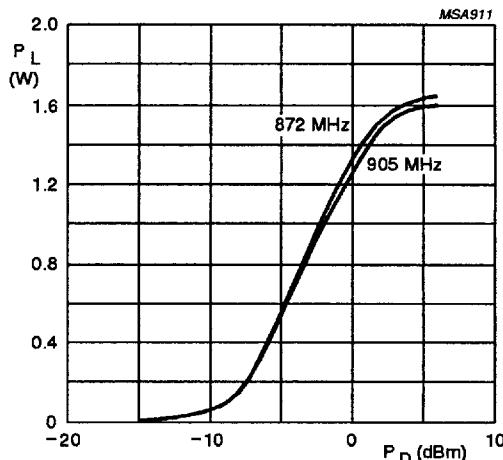
## UHF amplifier modules

BGY115A; BGY115B;  
BGY115C/P; BGY115D



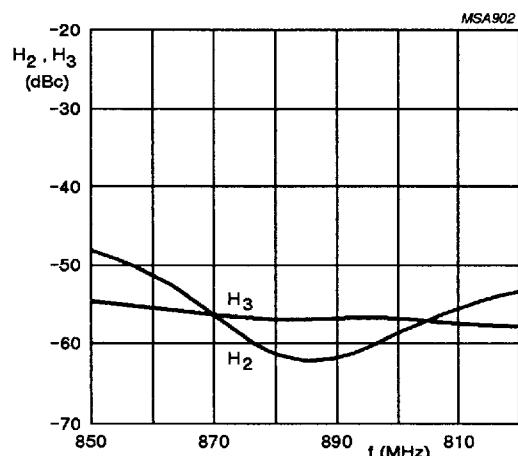
$Z_S = Z_L = 50 \Omega$ ;  $P_D = 2 \text{ mW}$ ;  $P_L = 1.2 \text{ W}$ ;  $V_S = 6 \text{ V}$ ;  $T_{mb} = 25^\circ\text{C}$ .

Fig.13 Control voltage and VSWR input as functions of frequency; BGY115B, typical values.



$Z_S = Z_L = 50 \Omega$ ;  $V_S = 6 \text{ V}$ ;  $V_C = 3.5 \text{ V}$ ;  $T_{mb} = 25^\circ\text{C}$ .

Fig.14 Load power as a function of drive power; BGY115B, typical values.

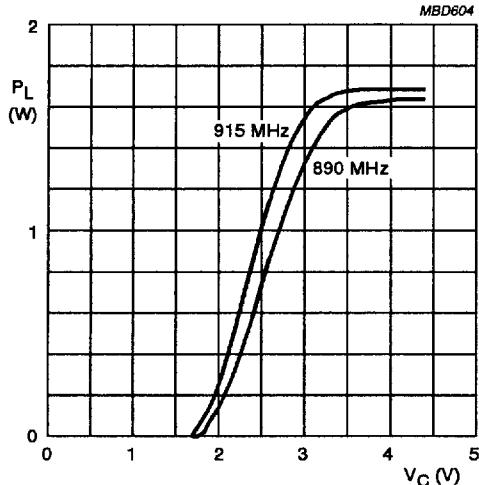


$Z_S = Z_L = 50 \Omega$ ;  $P_D = 2 \text{ mW}$ ;  $P_L = 1.2 \text{ W}$ ;  $V_S = 6 \text{ V}$ ;  $T_{mb} = 25^\circ\text{C}$ .

Fig.15 Harmonics as functions of frequency; BGY115B, typical values.

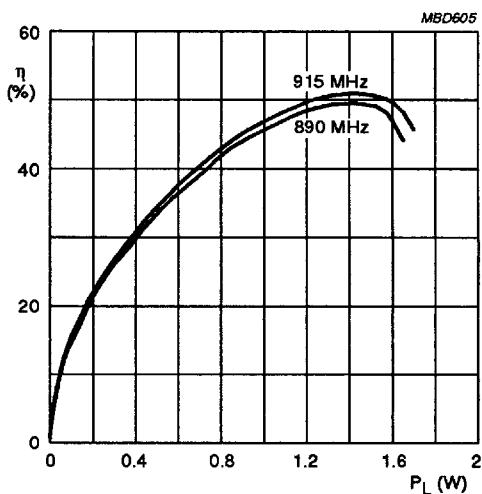
## UHF amplifier modules

BGY115A; BGY115B;  
BGY115C/P; BGY115D



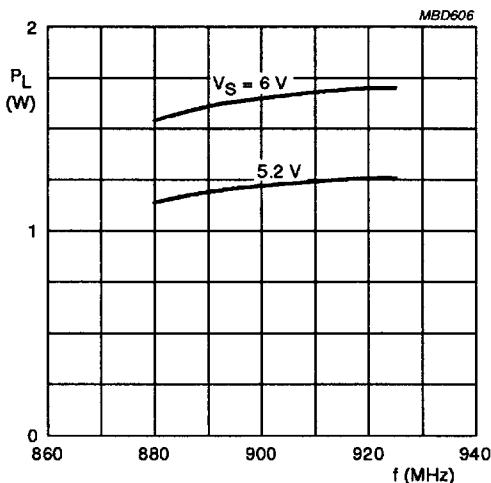
$Z_S = Z_L = 50 \Omega$ ;  $P_D = 2$  mW;  $V_S = 6$  V;  $T_{mb} = 25$  °C.

Fig.16 Load power as a function of control voltage;  
BGY115C/P, typical values.



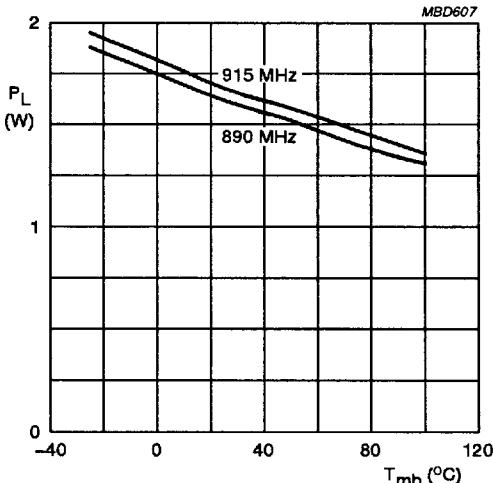
$Z_S = Z_L = 50 \Omega$ ;  $P_D = 2$  mW;  $V_S = 6$  V;  $T_{mb} = 25$  °C.

Fig.17 Efficiency as a function of load power;  
BGY115C/P, typical values.



$Z_S = Z_L = 50 \Omega$ ;  $P_D = 2$  mW;  $V_C = 3.5$  V;  $T_{mb} = 25$  °C.

Fig.18 Load power as a function of frequency;  
BGY115C/P, typical values.



$Z_S = Z_L = 50 \Omega$ ;  $P_D = 2$  mW;  $V_S = 6$  V;  $V_C = 3.5$  V.

Fig.19 Load power as a function of mounting base  
temperature; BGY115C/P, typical values.

## UHF amplifier modules

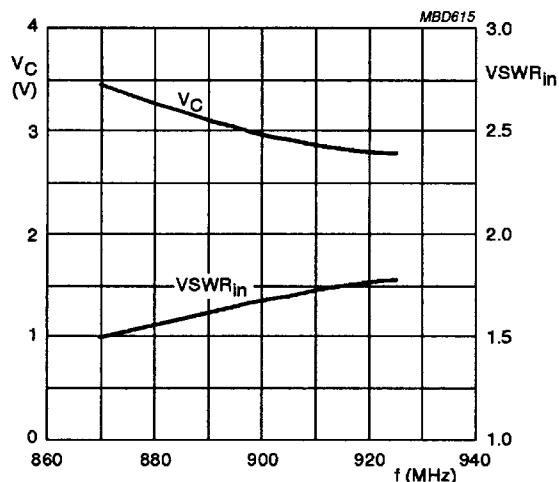
BGY115A; BGY115B;  
BGY115C/P; BGY115D $Z_S = Z_L = 50 \Omega$ ;  $P_D = 2 \text{ mW}$ ;  $P_L = 1.4 \text{ W}$ ;  $V_S = 6 \text{ V}$ ;  $T_{mb} = 25^\circ\text{C}$ .

Fig.20 Control voltage and VSWR input as functions of frequency; BGY115C/P, typical values.

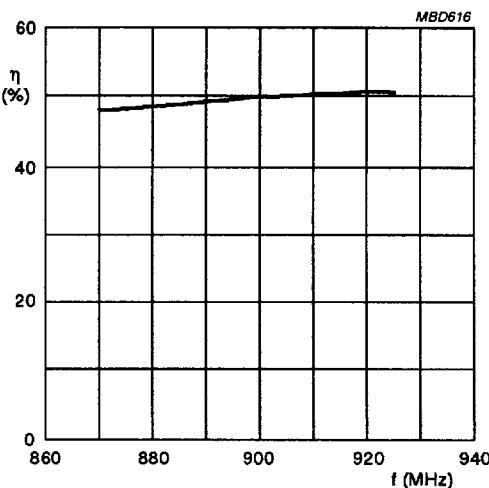
 $Z_S = Z_L = 50 \Omega$ ;  $P_D = 2 \text{ mW}$ ;  $P_L = 1.4 \text{ W}$ ;  $V_S = 6 \text{ V}$ ;  $T_{mb} = 25^\circ\text{C}$ .

Fig.21 Efficiency as a function of frequency; BGY115C/P, typical values.

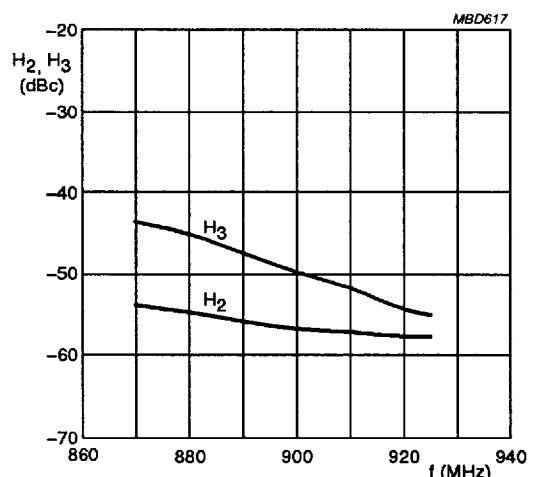
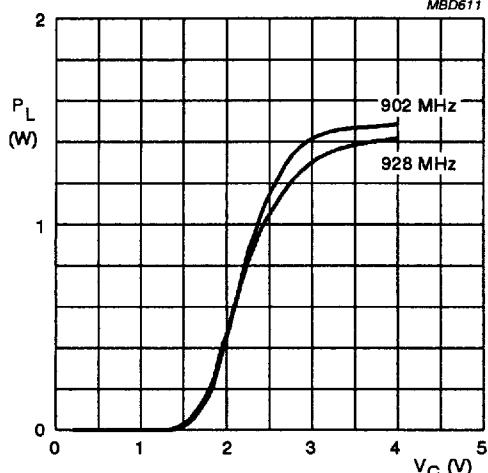
 $Z_S = Z_L = 50 \Omega$ ;  $P_D = 2 \text{ mW}$ ;  $P_L = 1.4 \text{ W}$ ;  $V_S = 6 \text{ V}$ ;  $T_{mb} = 25^\circ\text{C}$ .

Fig.22 Harmonics as functions of frequency; BGY115C/P, typical values.

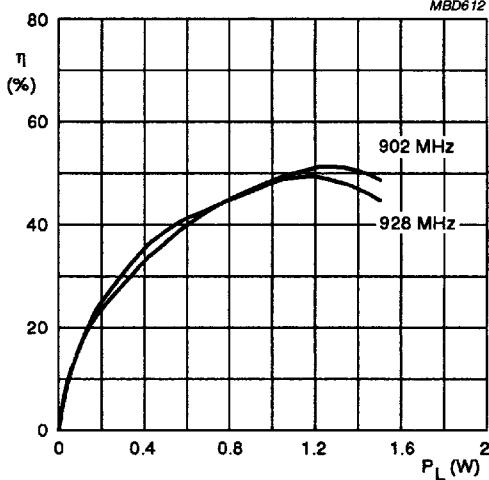
## UHF amplifier modules

BGY115A; BGY115B;  
BGY115C/P; BGY115D



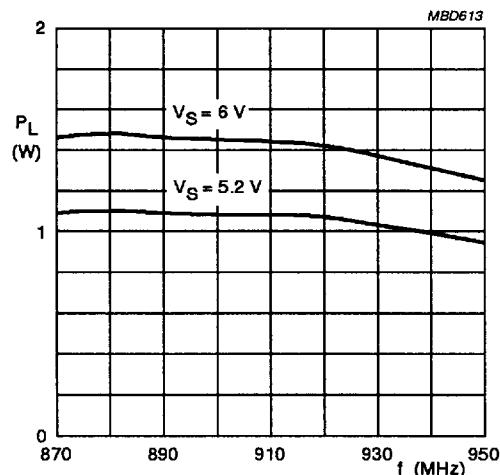
$Z_S = Z_L = 50 \Omega$ ;  $P_D = 2 \text{ mW}$ ;  $V_S = 6 \text{ V}$ ;  $T_{mb} = 25^\circ\text{C}$ .

Fig.23 Load power as a function of control voltage;  
BGY115D, typical values.



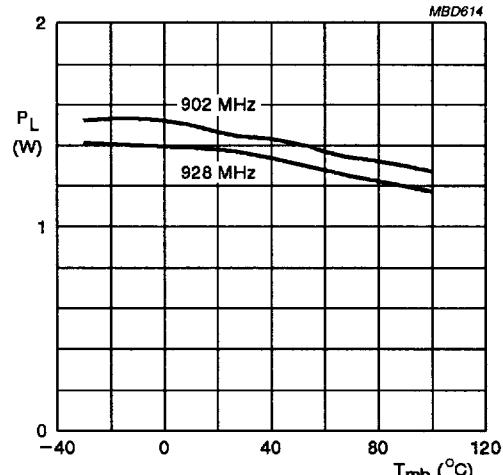
$Z_S = Z_L = 50 \Omega$ ;  $P_D = 2 \text{ mW}$ ;  $V_S = 6 \text{ V}$ ;  $T_{mb} = 25^\circ\text{C}$ .

Fig.24 Efficiency as a function of load power;  
BGY115D, typical values.



$Z_S = Z_L = 50 \Omega$ ;  $P_D = 2 \text{ mW}$ ;  $V_C = 3.5 \text{ V}$ ;  $T_{mb} = 25^\circ\text{C}$ .

Fig.25 Load power as a function of frequency;  
BGY115D, typical values.

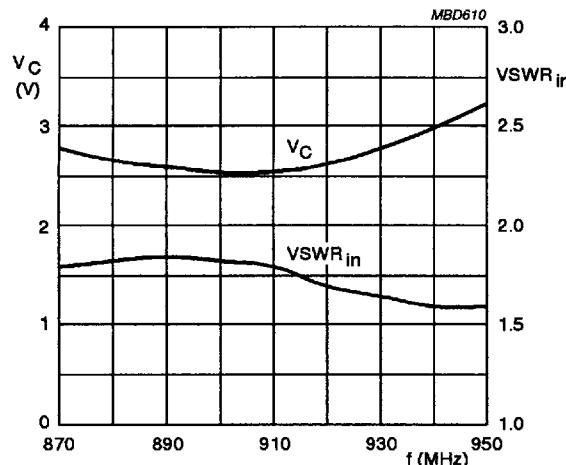


$Z_S = Z_L = 50 \Omega$ ;  $P_D = 2 \text{ mW}$ ;  $V_S = 6 \text{ V}$ ;  $V_C = 3.5 \text{ V}$ .

Fig.26 Load power as a function of mounting base  
temperature; BGY115D, typical values.

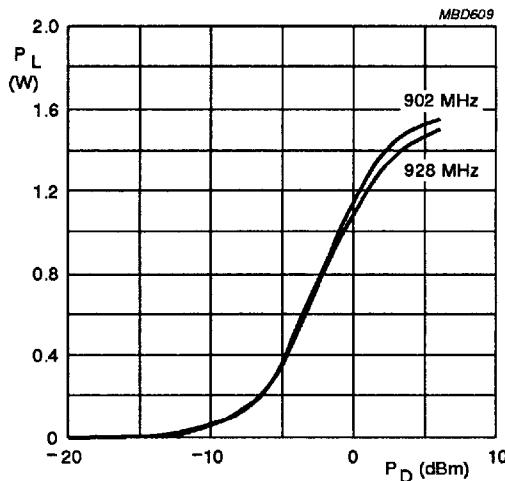
## UHF amplifier modules

BGY115A; BGY115B;  
BGY115C/P; BGY115D



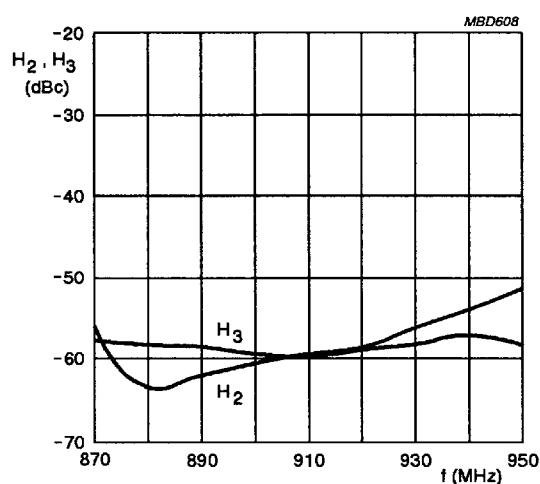
$Z_S = Z_L = 50 \Omega$ ;  $P_D = 2 \text{ mW}$ ;  $P_L = 1.2 \text{ W}$ ;  $V_S = 6 \text{ V}$ ;  $T_{mb} = 25^\circ\text{C}$ .

Fig.27 Control voltage and VSWR input as functions of frequency; BGY115D, typical values.



$Z_S = Z_L = 50 \Omega$ ;  $V_S = 6 \text{ V}$ ;  $V_C = 3.5 \text{ V}$ ;  $T_{mb} = 25^\circ\text{C}$ .

Fig.28 Load power as a function of drive power; BGY115D, typical values.



$Z_S = Z_L = 50 \Omega$ ;  $P_D = 2 \text{ mW}$ ;  $P_L = 1.2 \text{ W}$ ;  $V_S = 6 \text{ V}$ ;  $T_{mb} = 25^\circ\text{C}$ .

Fig.29 Harmonics as functions of frequency; BGY115D, typical values.

## UHF amplifier modules

BGY115A; BGY115B;  
BGY115C/P; BGY115D

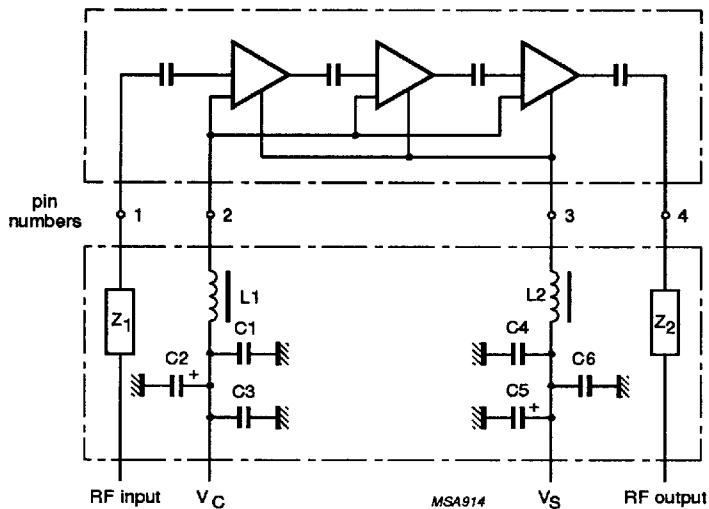
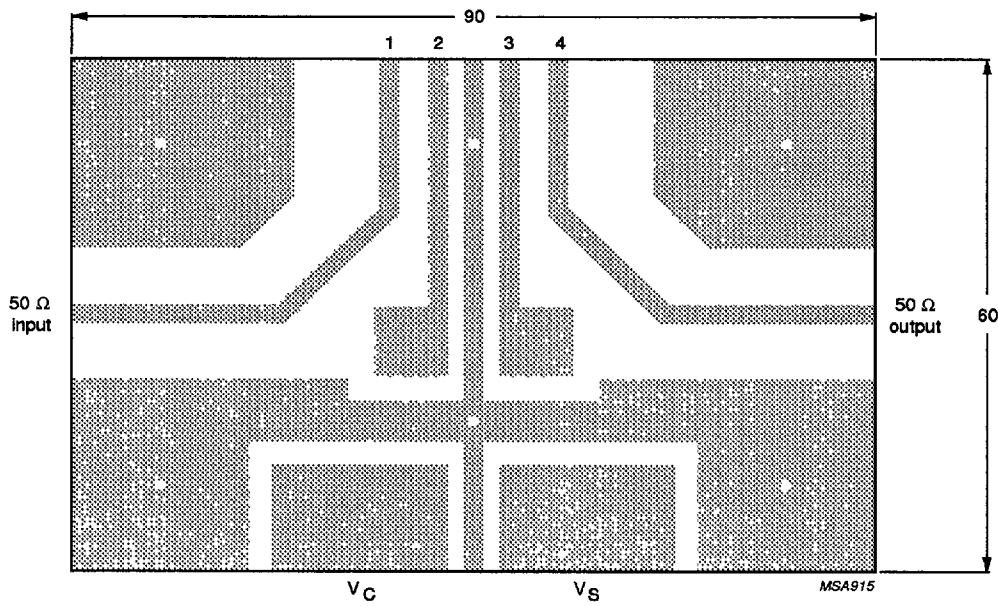


Fig.30 Test circuit.



Dimensions in mm.

Fig.31 Printed-circuit board layout.

## UHF amplifier modules

BGY115A; BGY115B;  
BGY115C/P; BGY115D

## List of components (see Fig.30)

COMPONENT	DESCRIPTION	VALUE	CATALOGUE NO.
C1, C4	multilayer ceramic chip capacitor	100 nF	2222 852 47104
C2, C5	35 V tantalum capacitor	2.2 µF	-
C3, C6	multilayer ceramic chip capacitor	33 pF	2222 851 13339
L1, L2	Ferroxcube coil	5 µH	3122 108 20153
Z <sub>1</sub> , Z <sub>2</sub>	stripline; note 1	50 Ω	-

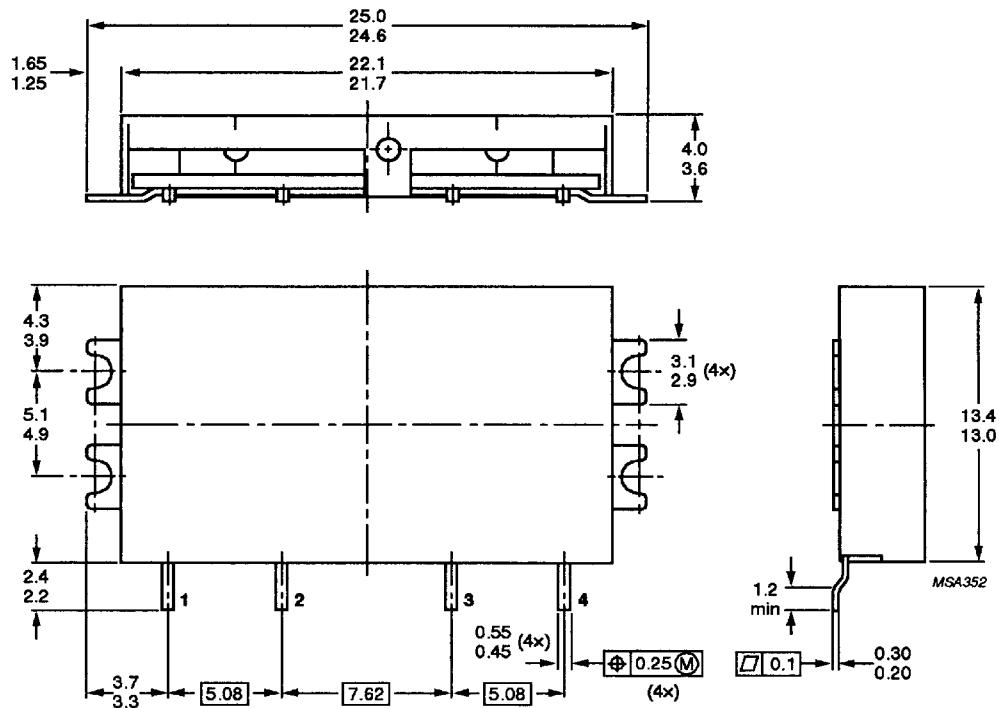
## Note

1. The striplines are on a double copper-clad printed-circuit board with PTFE fibre-glass dielectric ( $\epsilon_r = 2.2$ ); thickness  $1/32$  inch.

## UHF amplifier modules

BGY115A; BGY115B;  
BGY115C/P; BGY115D

## PACKAGE OUTLINE



Dimensions in mm.

Fig.32 SOT321A.